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SMD Operations Procedures Manual

8.1.1.25 OPERATION OF NORTHROP/GRUMMAN WRAPPING MACHINE

Text Pages 1 through 6
Attachment 1

Hand Processed Changes

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Preparer(s): L. Goudikian

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8.1.1.25 Operation of Northrop/Grumman Wrapping Machine

1. Purpose and Scope

1.1 The purpose of this document is to provide instructions for:

1.1.1 operating the Northrop/Grumman Wrapping Machine (Wrapping Machine), located in Building 902;

1.1.2 testing the safety interlocks of the Wrapping Machine.

1.2 The following is not found in this document:

1.2.1 Detailed instructions for the wrapping of specific items (warm-up heaters, busses...), which are found in the applicable Magnet Assembly Procedure.

1.2.2 Instructions for operating the oven section of the Wrapping Machine. The oven, though still attached to the Machine, has been electrically disconnected and is not operational.

1.3 This document is intended for authorized operators of the Wrapping Machine.

2. Responsibilities

2.1 The Cognizant Technical Supervisor shall:

2.1.1 maintain a list of authorized operators of the Wrapping Machine.

2.1.2 ensure that operators have been instructed before operating the Machine.

2.2 The Authorized Operator shall periodically test the safety interlocks.

3. Prerequisites

3.1 Training

The Operator shall receive instruction from the Cognizant Technical Supervisor, or designee.

3.2 Manpower

The Wrapping Machine may be operated by one person.

3.3 Equipment

No personal protective equipment is required if the precautions stated in Section 4: "Precautions", are heeded.

4. Precautions

4.1 The main hazard associated with operating the Northrop/Grumman Wrapping Machine is moving and rotating parts. To minimize the hazard:

CAUTION

Prior to use, ensure interlocks have been tested satisfactory within the past six months.

4.1.1 Periodically test the safety interlocks, and promptly repair any failed interlocks.

4.1.2 Keep cover panels, chain drive guards, and plexiglass shields in place during operations.

4.2 The links at the ends of the feed cables will not fit through the Teflon inserts at the ends of the support tubes. The motion limit switches should protect against damage. Nevertheless, the Operator should use caution when the links are near the Teflon inserts.

4.3 To prevent damage to the feed rate mechanism, do not attempt to turn the PIV crank unless the motor is running and the feed line is moving.

5. Procedure

Section I: Initial Settings

5.1 Main disconnect switch, located under the wrapping head assembly and labeled "Main Disconnect", in the "OFF" position.

NOTE:

The machine is powered by circuit breaker #18 in panel RP P2-2 located on the Southwest wall of building 902.

5.2 Motor speed dial set to zero.

5.3 Motor "ON/OFF" toggle switch set to "OFF".

5.4 Motor "START/STOP" toggle switch set to "STOP".

5.5 "HEAD CLUTCH" switch set to "OFF".

5.6 All indicator lights should be extinguished.

NOTE:

Other control settings are not important at this time. The section labeled "OVEN" is not operational.

Section II: Activating Power

5.7 Place the main input disconnect switch in the "ON" position.

5.8 Depress the green push button labeled "POWER ON".

Section III: Setting the Amount of Overlap

5.9 Perform the steps in Sections I and II.

5.10 Set the motor "ON/OFF" toggle switch to "ON".

5.11 Set the motor "FORWARD/REV" toggle switch to "FORWARD".

5.12 Set the motor "START/STOP" toggle switch to "START" (the switch is a momentary contact switch and will snap back to a neutral position.)

5.13 Set the "HEAD CLUTCH" switch to "ON".

5.14 Slowly turn the “MOTOR SPEED" dial until the wrapping heads begin rotating and the line begins moving.

5.15 Adjust the “MOTOR SPEED” dial until the digital display labeled "HEAD RPM" indicates 100 RPM.

5.16 Adjust the feed rate by turning the PIV crank.

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NOTE:

The wrapping pitch is calculated by dividing the feed rate by the rate of revolution:

$$\text{pitch (In. Per Rev.)} = \frac{\text{feed rate (IPM)}}{\text{head revolution rate (RPM)}}$$

For instance, a desired pitch of 0.5 inches will be obtained by setting the feed rate to 50 IPM and the head rate to 100 RPM.

Once the ratio is set, the PIV crank should not be touched except for minor adjustments as necessary.

The motor speed may be adjusted without changing the ratio.

5.17 When the desired ratio is set, turn the “MOTOR SPEED” dial to zero and place the motor "ON/OFF" toggle switch in the "OFF" position.

Section IV: Setting Up Material to be Wrapped

5.18 Refer to the applicable Magnet Assembly Procedure for detailed instructions on setting up material to be wrapped.

5.19 To facilitate mounting the spools, a red push button located next to the wrapping heads, inside the plexi glass shield, may be depressed to release the head clutch. This will allow the head to be manually spun. Before depressing this push button, the steps in Section I and II should be performed. Otherwise, the push button will not be operable.

Section V: Running the Wrapping Machine

5.20 Set the motor "ON/OFF" toggle switch to "ON".

5.21 Set the motor "FORWARD/REV" toggle switch to the desired direction.

5.22 Set the motor "START/STOP" toggle switch to "START" momentarily.

5.23 Set the "HEAD CLUTCH" switch to "ON".

5.24 Slowly turn the “MOTOR SPEED" dial until the wrapping heads begin rotating and the material to be wrapped begins feeding into the Machine, and continue turning the dial until the desired speed is reached.

5.25 If the motor is stopped during wrapping (for instance, to reverse the feed direction), then it will be necessary to push the motor "START/STOP" toggle switch to the "START" position to restart the motor.

Section VI: Shutting off the Wrapping Machine

5.26 For an emergency shutdown:

5.26.1 Depress the large red push button on the control panel labeled "Emergency Stop".

5.27 For a normal shutdown:

5.27.1 In the section of the control panel labeled "MOTOR", set the "MOTOR SPEED" dial to zero, the "ON/OFF" toggle switch to "OFF", the "START/STOP" toggle switch to "STOP".

5.27.2 Set the "HEAD CLUTCH" switch to "OFF".

5.28 Place the main input disconnect switch in the "OFF" position.

Section VII: Testing the Safety Interlocks

NOTE:

The interlocks shall be tested every six months during operations.

Door Interlock and Emergency Stop Switch

5.29 Perform the steps in Sections I and II.

5.30 Set the motor "ON/OFF" toggle switch to "ON".

5.31 Set the motor "FORWARD/REV" toggle switch to "FORWARD".

5.32 Set the motor "START/STOP" toggle switch to "START".

5.33 Set the "HEAD CLUTCH" switch to "ON".

5.34 Slowly turn the motor "MOTOR SPEED" dial until the wrapping heads begin rotating and the line begins moving.

5.35 Trip the interlock by opening the plexiglass shield door. Verify that machine motion stops and the amber light, located above the green "POWER ON" push button, extinguishes.

5.36 Close the door and repeat steps 5.29 to 5.35 except trip the interlock by depressing the emergency stop switch.

Limit Switches

5.37 Repeat steps 5.29 to 5.34.

5.38 Increase the feed rate so that the drive is moving at a typical operational speed.

5.39 When the forward limit is reached, verify that machine motion stops and the "FWD LIMIT" red indicator light turns on.

5.40 Repeat steps 5.29 to 5.34, except set the drive to move in the reverse direction.

5.41 Increase the feed rate so that the drive is moving at a typical operational speed.

5.42 When the reverse limit is reached, verify that machine motion stops and the "REV LIMIT" red indicator light turns on.

5.43 Complete the checklist (see Attachment 1) and post the checklist on the Machine.

6. Documentation

6.1 Safety Interlock Test Checklist

6.2 Traveler

7. References

None

8. Attachments

1. Northrop/Grumman Wrapping Machine: Safety Interlock Test Checklist

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Attachment 1

Northrop/Grumman Wrapping Machine: Safety Interlock Test Checklist

Door interlock located on plexiglass shield	Pass9 Fail9	Pass9 Fail9	Pass9 Fail9	Pass9 Fail9	Pass9 Fail9	Pass9 Fail9
Emergency stop switch	Pass9 Fail9	Pass9 Fail9	Pass9 Fail9	Pass9 Fail9	Pass9 Fail9	Pass9 Fail9
Forward limit switch	Pass9 Fail9	Pass9 Fail9	Pass9 Fail9	Pass9 Fail9	Pass9 Fail9	Pass9 Fail9
Reverse limit switch	Pass9 Fail9	Pass9 Fail9	Pass9 Fail9	Pass9 Fail9	Pass9 Fail9	Pass9 Fail9
Date Tested						
Initials of Tester						
Expiration Date						